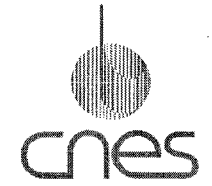
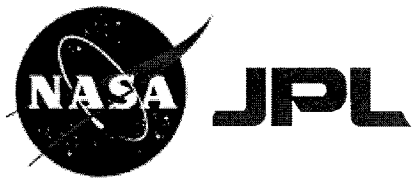




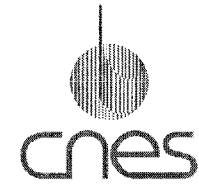
Jason-1



Jason-1 *Sea Level From Space*



Joint Missions



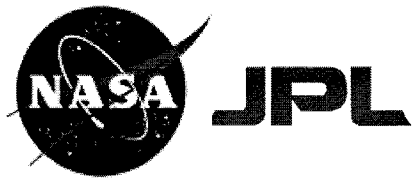
An International Collaboration; NASA & CNES

Jason-1 is a follow-on to TOPEX/POSEIDON

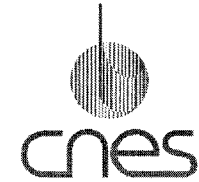
Launch; Fall 2001



Jason-1 *Sea Level From Space*



Goals



- **Continue sea-surface topography measurements from TOPEX/POSEIDON into the future with unprecedented accuracy**
- **Global datasets to scientists and operational users worldwide, free of charge**
- **Near real-time satellite data within hours of acquisition**
- **Valuable data to the scientific & user communities for a minimum of three years, with an extended mission goal of five years**



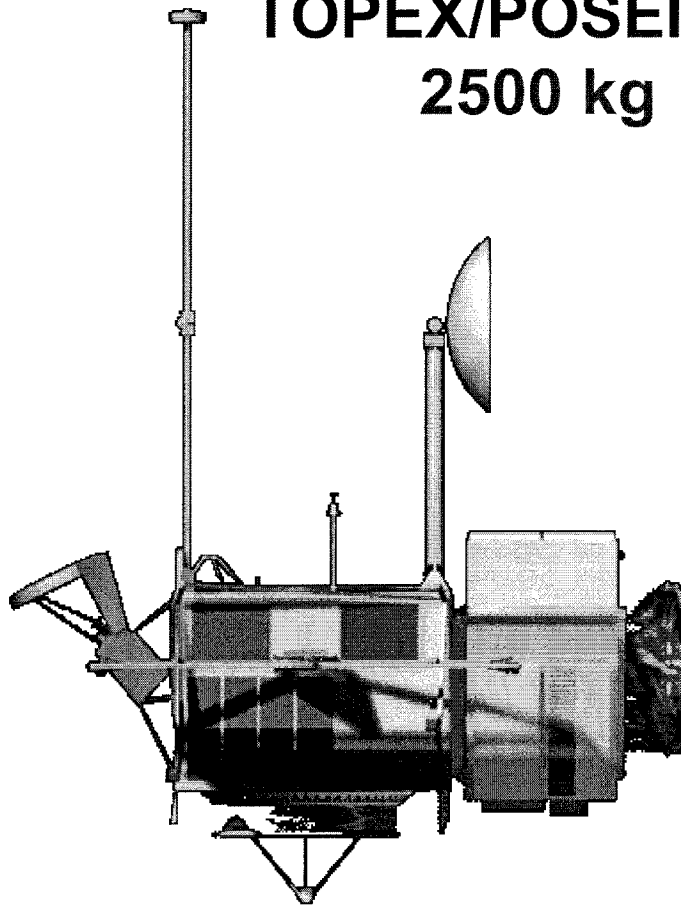
TOPEX/POSEIDON TO JASON-1

Technology; Smaller & Lighter



TOPEX/POSEIDON

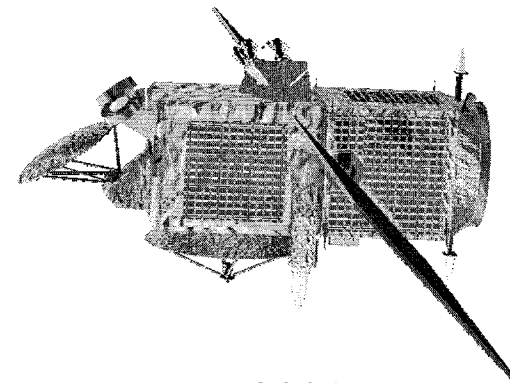
2500 kg



1992

Jason-1

500 kg

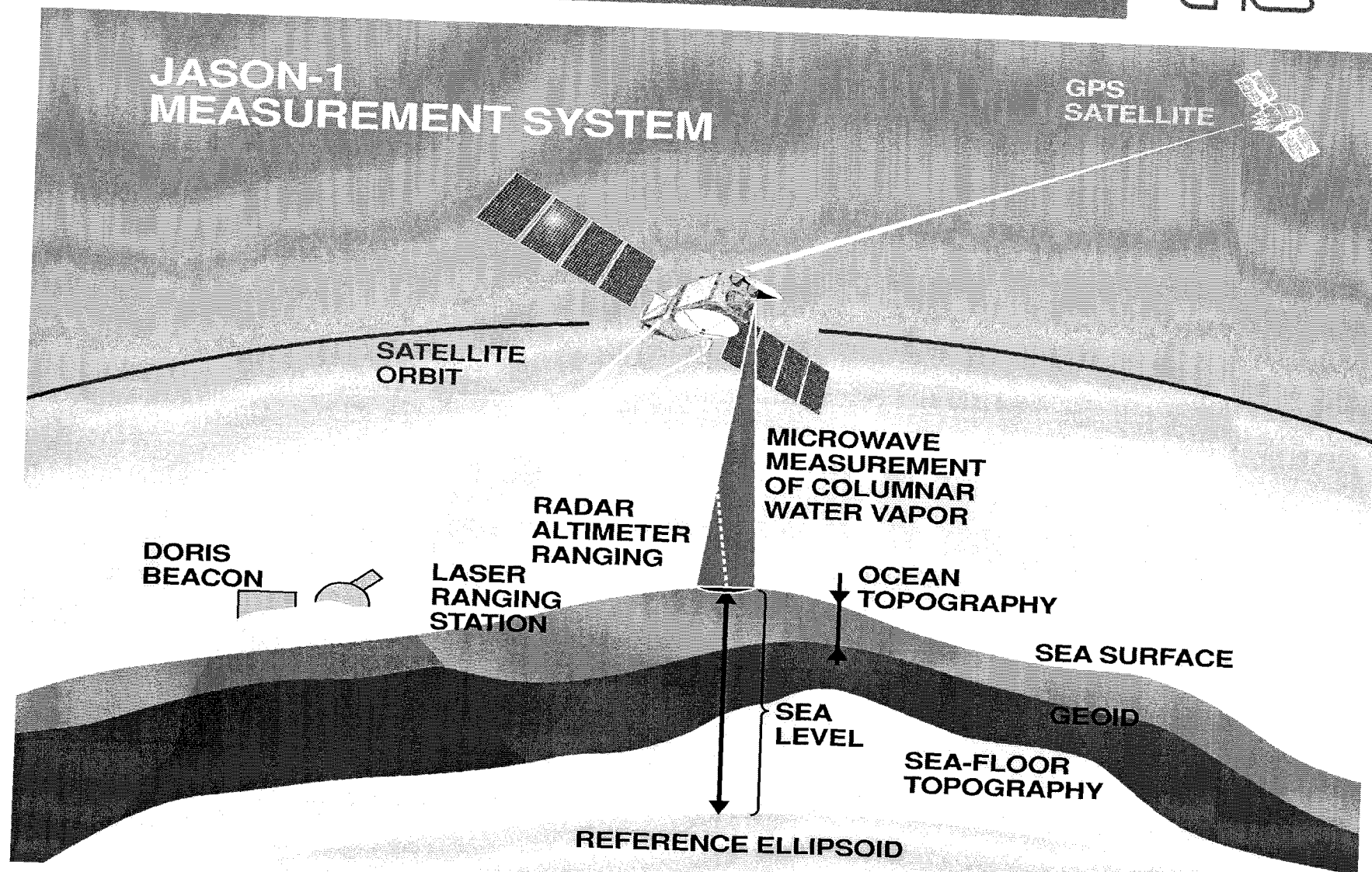


2001

Jason-1 *Sea Level From Space*



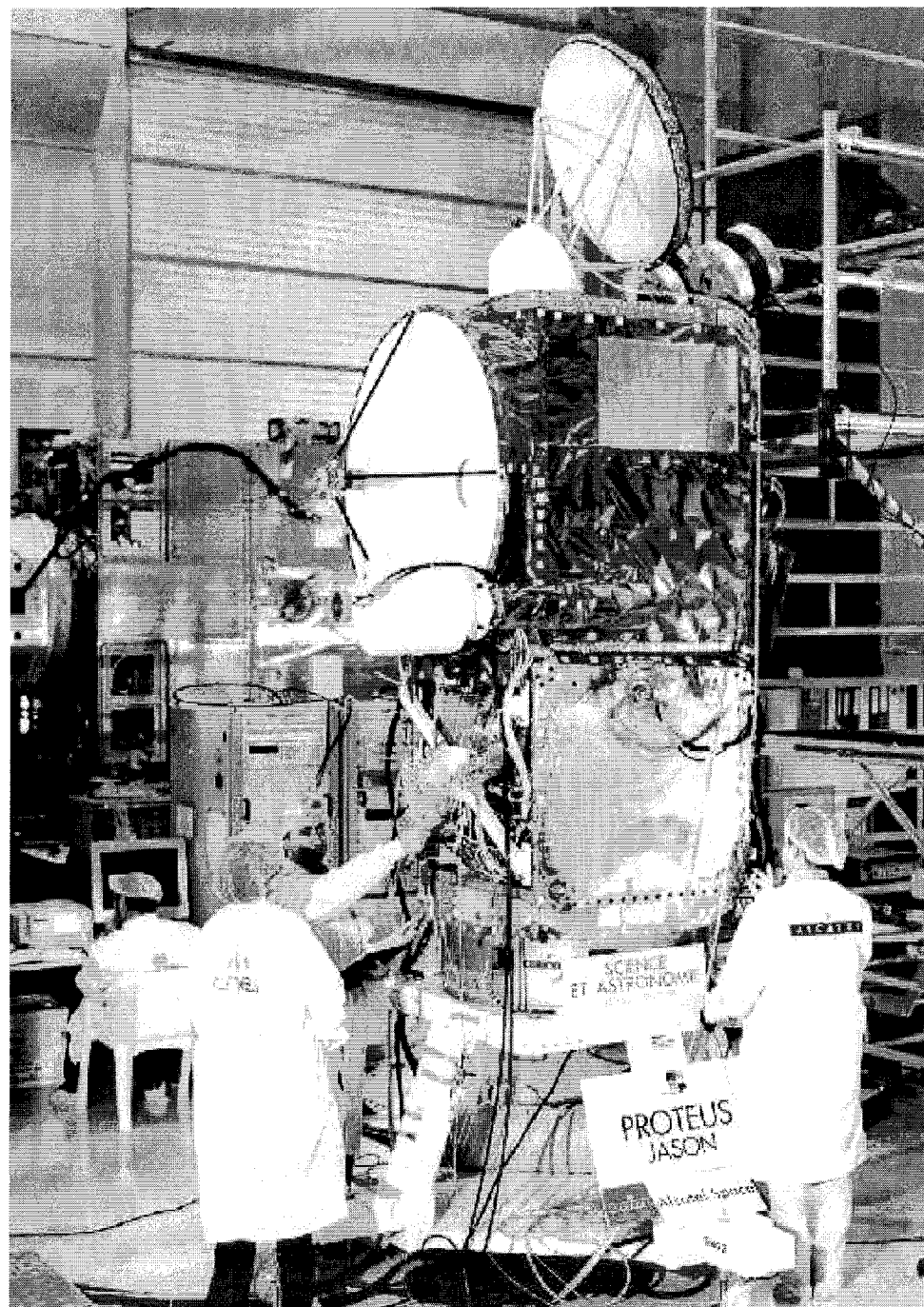
Jason-1 Altimetry

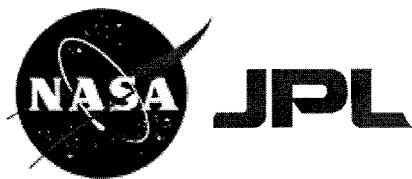


Jason-1 Sea Level From Space

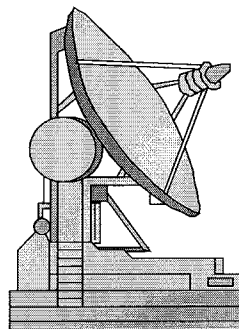


ALCATEL
Building Jason-1
Cannes, France



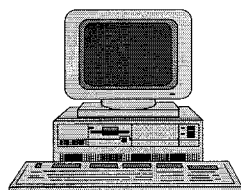


Flight Elements



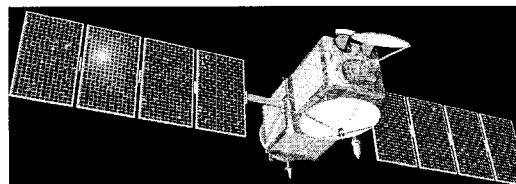
Ground Systems

Poker Flat, Alaska
Wallops Island, Virginia
Aussaguel, France



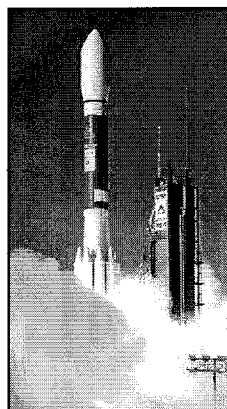
Satellite Operations Control Centers

JPL, Pasadena, California
CNES, Toulouse, France



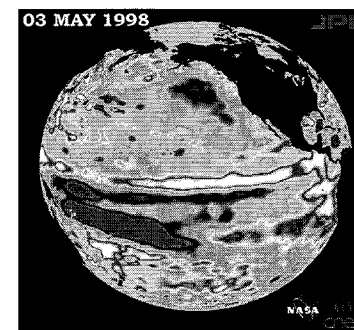
Spacecraft Bus & Payload

Poseidon 2 altimeter
DORIS receiver
Microwave radiometer
Turbo Rogue Space Receiver
Laser Retroreflector Array

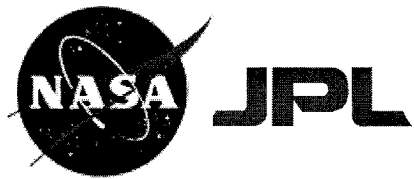


Launch Vehicle

Delta II from Vandenberg AFB



Jason-1 *Sea Level From Space*



Science



Extend ocean topography measurements into the 21st century

Provide a 5-year global view of sea surface height

Increase understanding of ocean circulation

Measure global sea level change

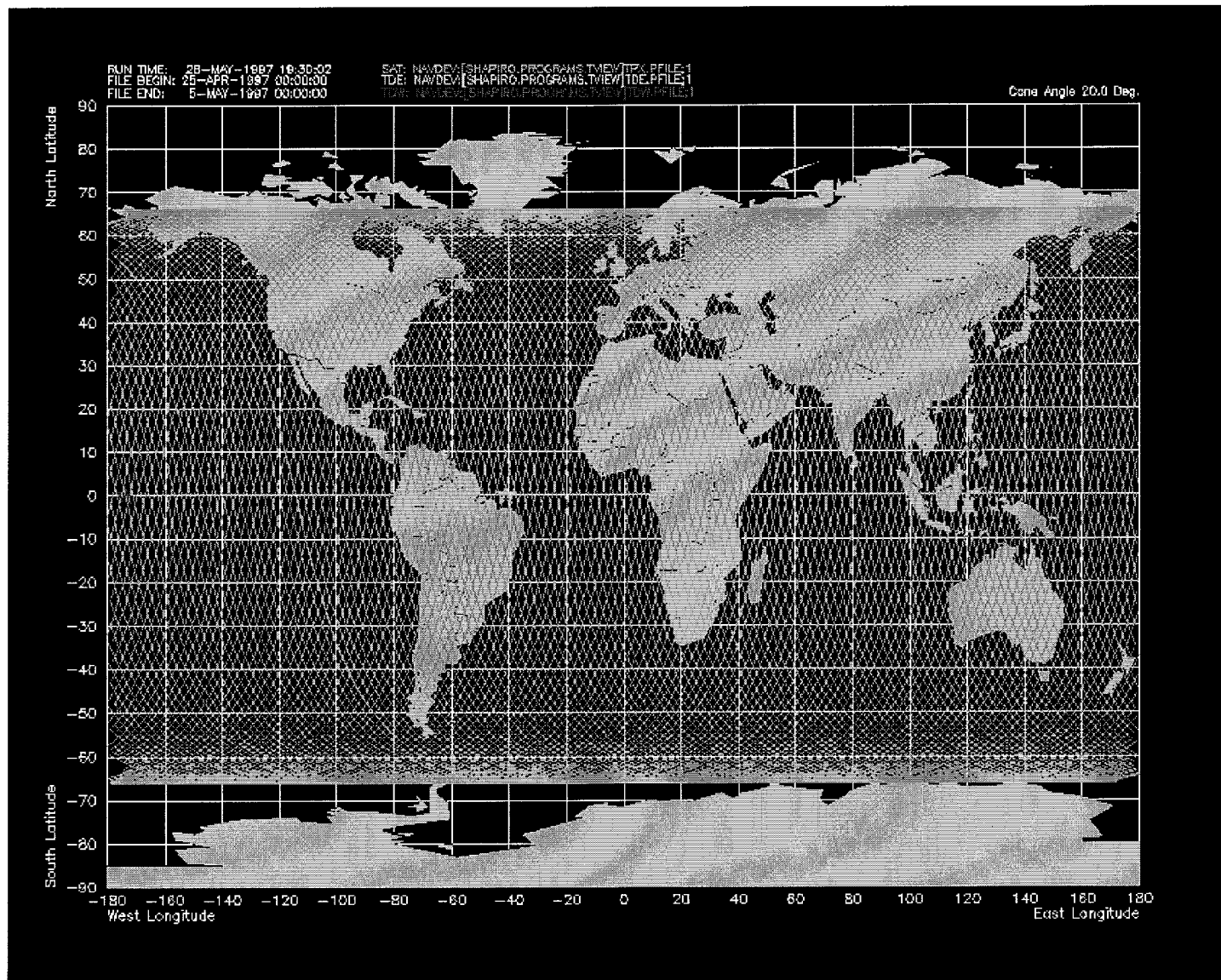
Improve forecasting of events such as El Niño

Provide near real-time data for operational activities

Jason-1 *Sea Level From Space*



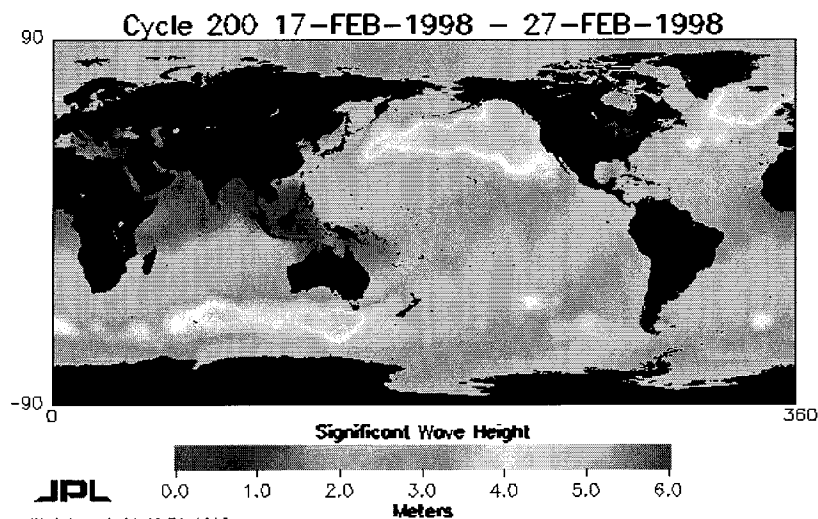
Ground Tracks



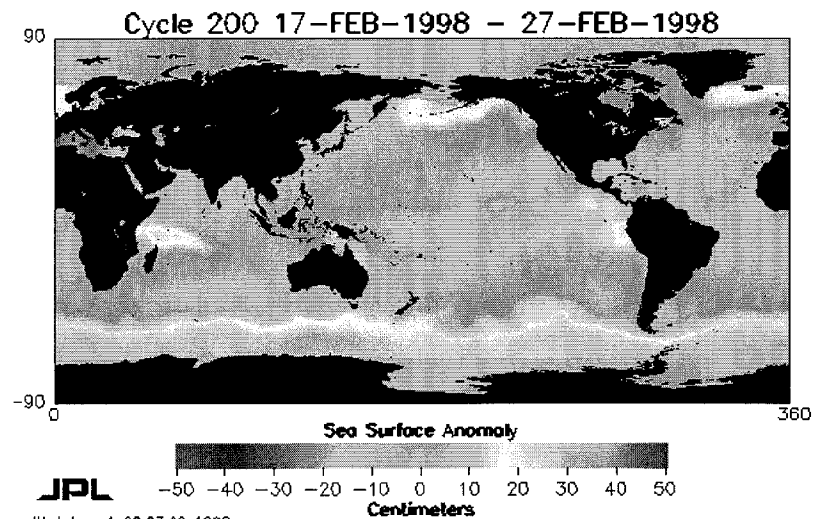
Jason-1 Sea Level From Space



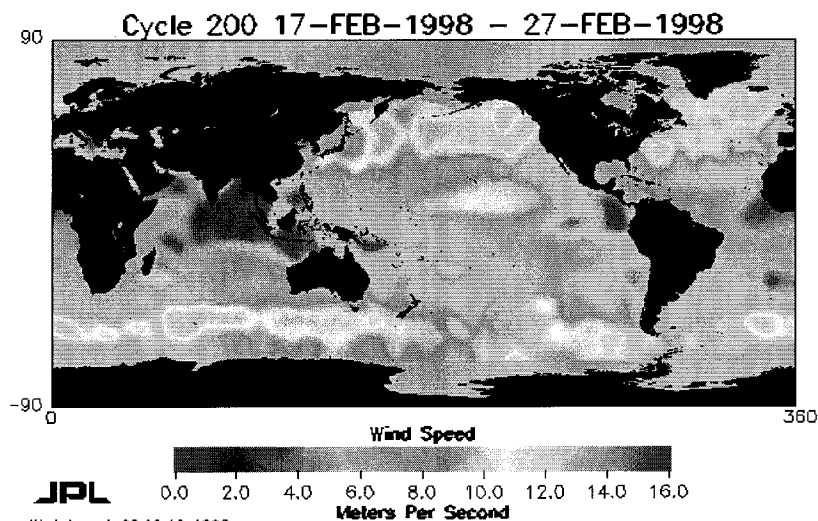
Multidisciplinary Studies



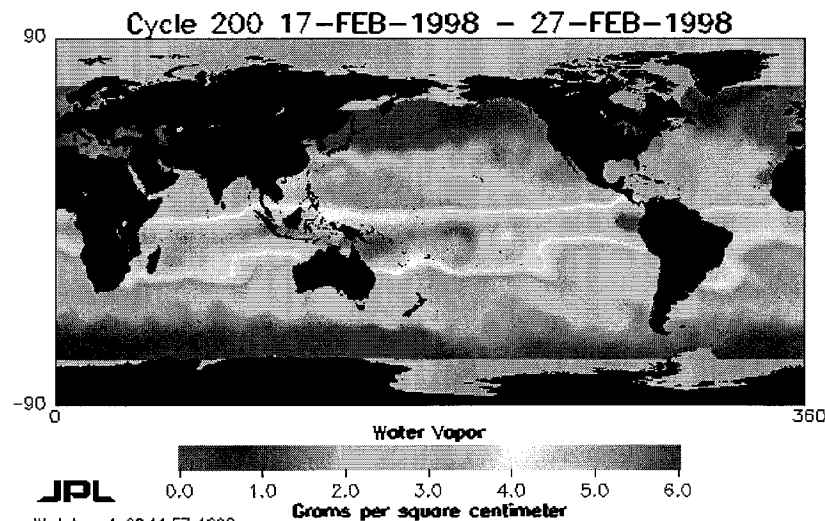
Wed Apr 1 21:48:51 1998



Wed Apr 1 22:23:09 1998



Wed Apr 1 22:02:10 1998

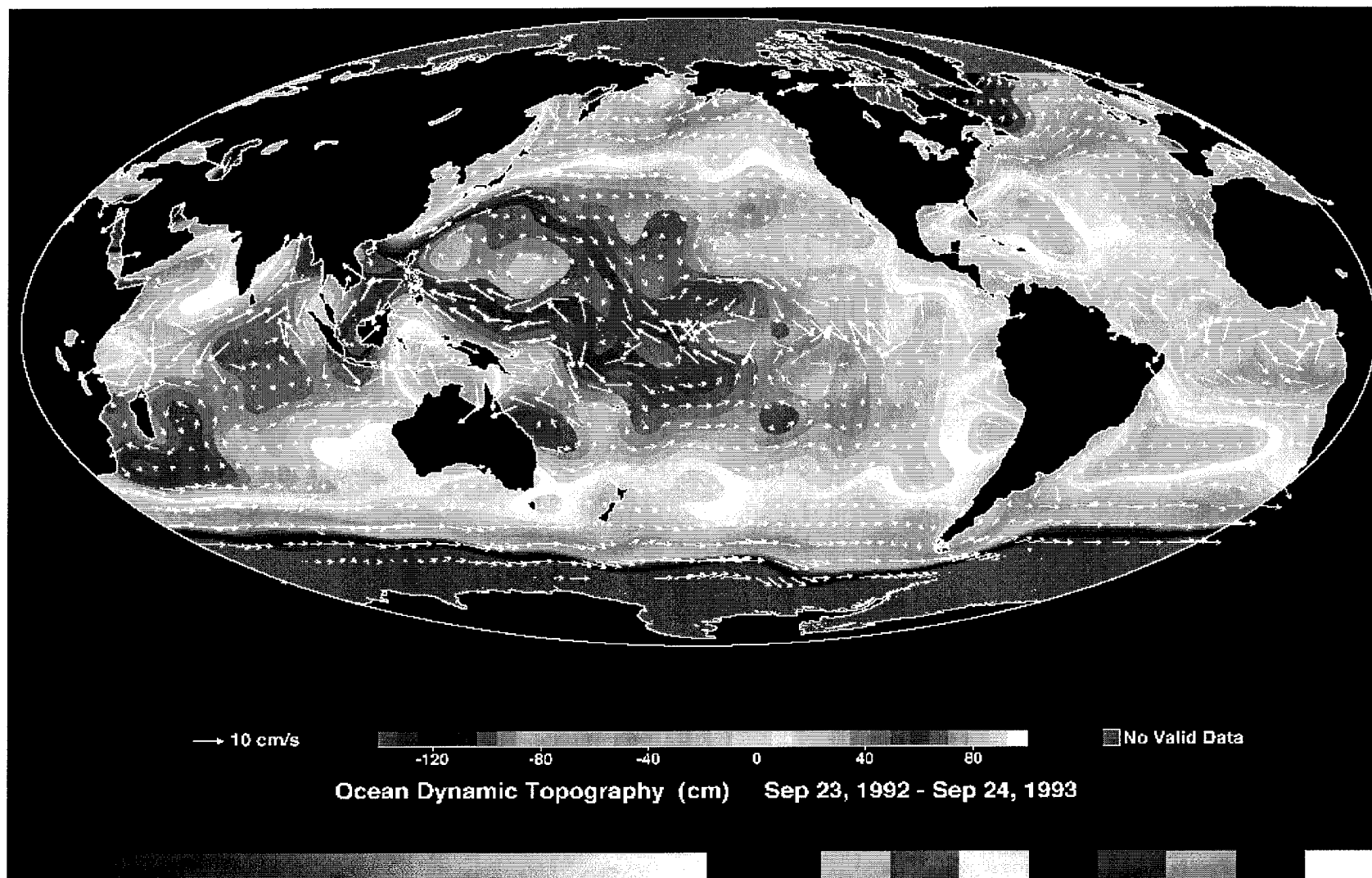
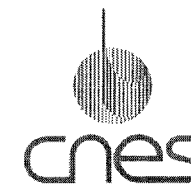


Wed Apr 1 22:11:57 1998

Jason-1 Sea Level From Space



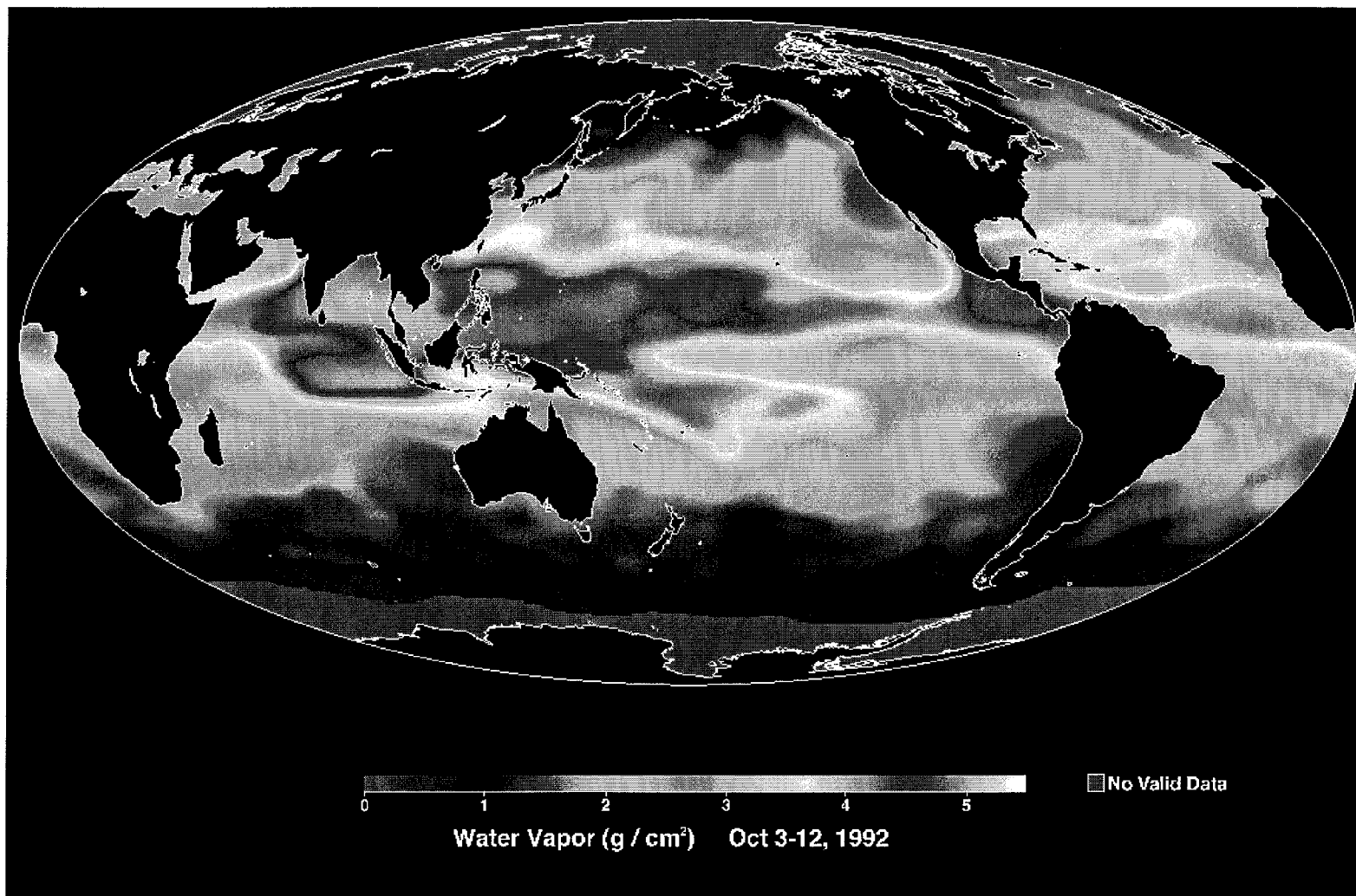
Dynamic Ocean Currents



Jason-1 *Sea Level From Space*



Water Vapor Measurements

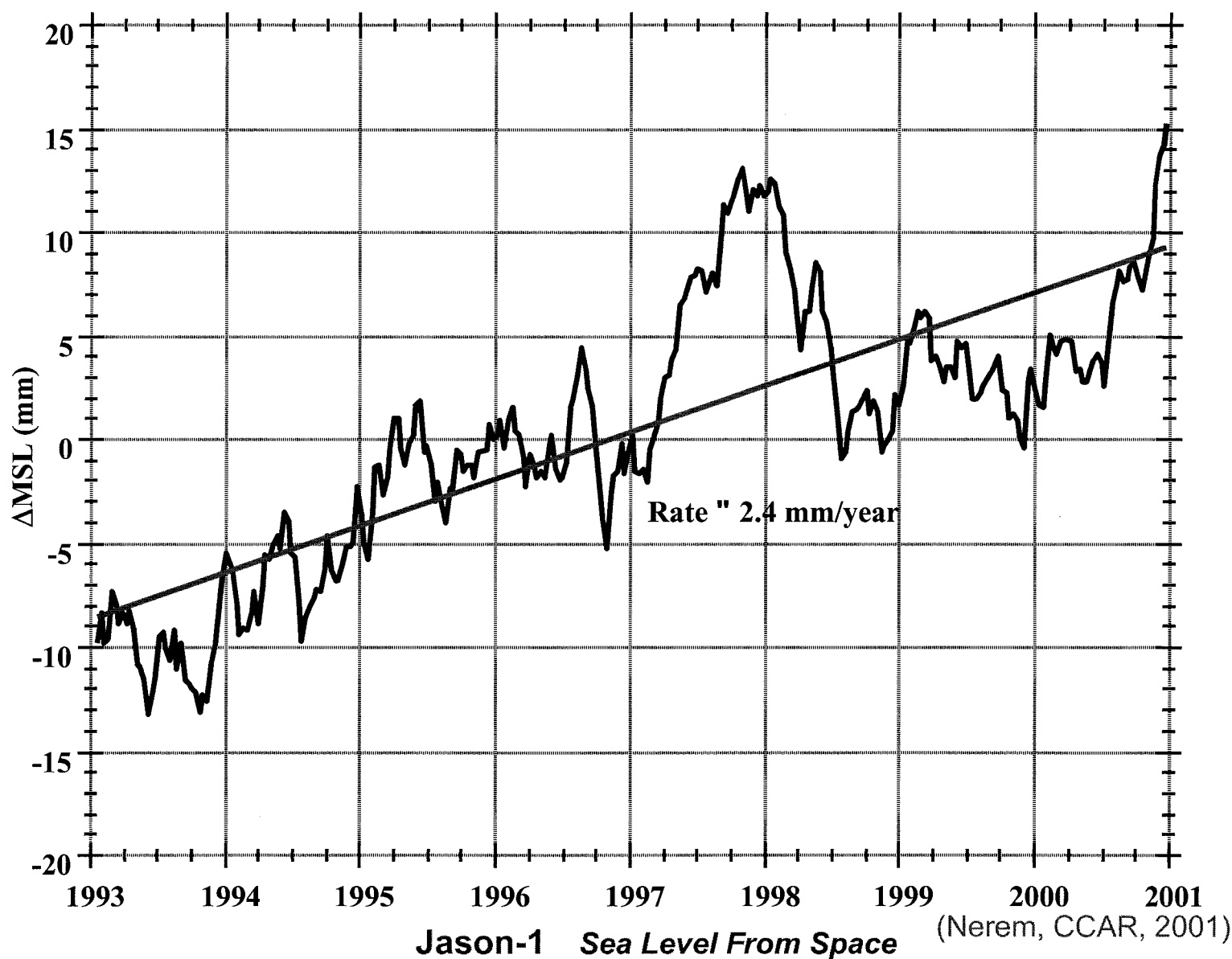


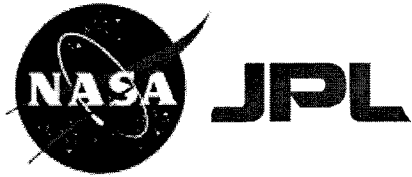
Jason-1 *Sea Level From Space*



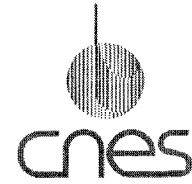
JPL

Global Mean Sea Level Change

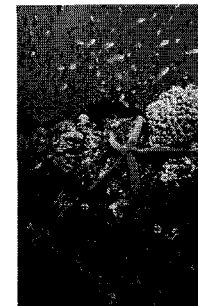
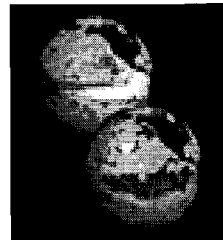
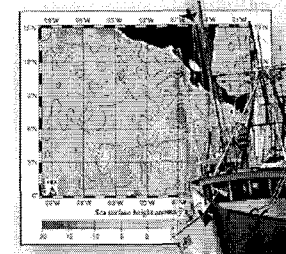
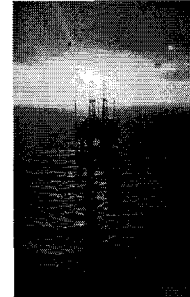
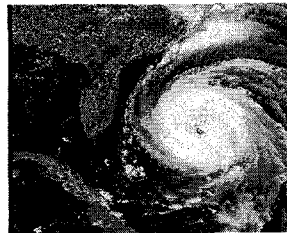




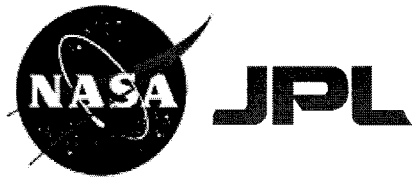
Applications



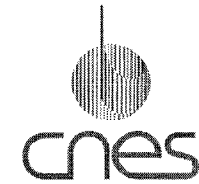
- Climate Research
- Ship Routing
- Offshore Industries
- Hurricane Forecasting
- Fisheries Management
- Marine Mammals Research
- El Niño & La Niña Forecasting
- Coral Reef Research
- Ocean Debris Tracking



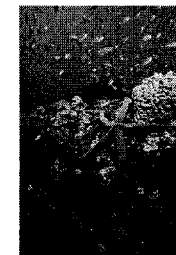
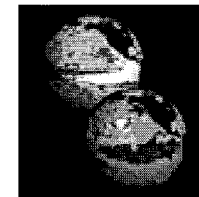
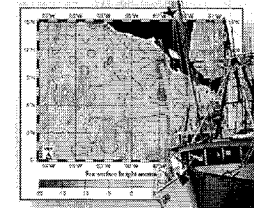
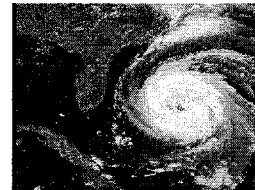
Jason-1 *Sea Level From Space*



Applications



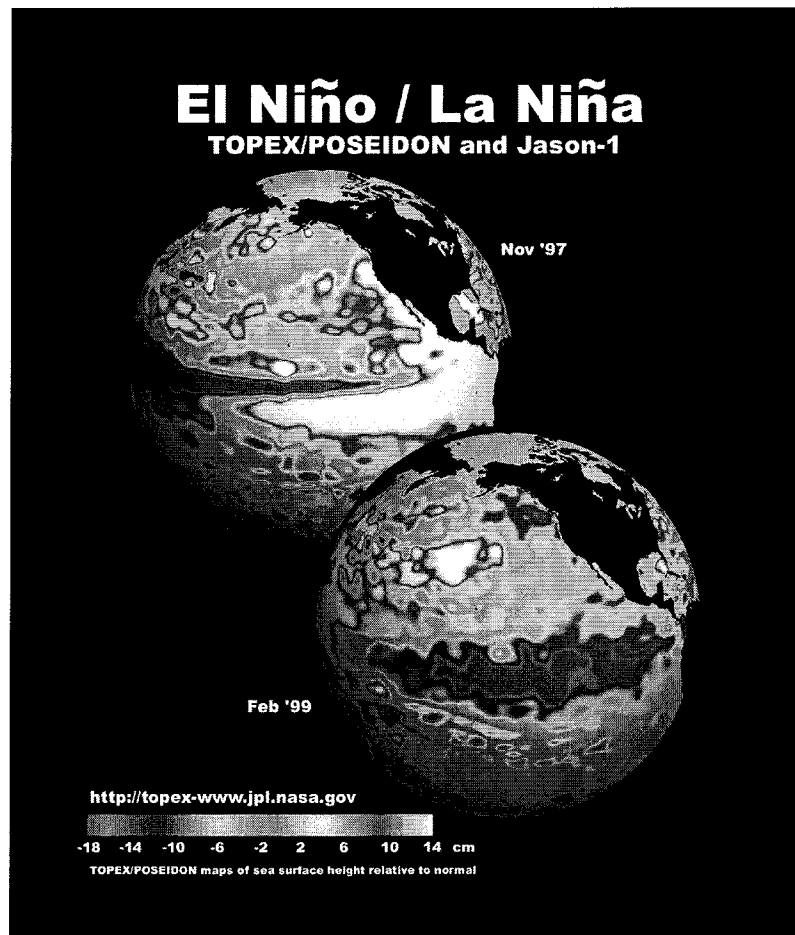
- Climate Research:** By modeling changes in the distribution of heat in the ocean with TOPEX/POSEIDON & Jason-1 data, scientists can study patterns of evaporation and resultant precipitation in the ocean system.
- Ship Routing:** Maps of currents and eddies from TOPEX/POSEIDON and Jason-1 are used in commercial shipping and recreational yachting to optimize routes.
- Offshore Industries:** Cable-laying vessels and offshore oil operations require accurate knowledge of ocean circulation patterns to minimize impacts from strong currents.
- Hurricane Forecasting:** Altimeter data are incorporated into atmospheric models for hurricane season forecasting and individual storm severity.
- Fisheries Management:** Altimeter data identifies ocean eddies which bring an increase in organisms that comprise the marine food web, attracting fish and fishermen.
- Marine Mammal Research:** Sperm whales, fur seals, and other marine mammals can be tracked, and therefore studied, around ocean eddies where nutrients and plankton are abundant.
- El Niño & La Niña Forecasting:** Understanding the pattern and effects of climate cycles such as the El Niño Southern Oscillation (ENSO) is a primary goal of the TOPEX/POSEIDON and Jason-1 missions.
- Coral Reef Research:** Altimeter data is used to monitor and assess coral reef ecosystems, which are sensitive to changes in ocean temperature due to large-scale climate variability.
- Ocean Debris Tracking:** Altimeter data can be used to calculate ocean currents to identify likely locations of marine debris which can pose a hazard to coral reefs, marine mammals, and oceangoing vessels.



Jason-1 *Sea Level From Space*



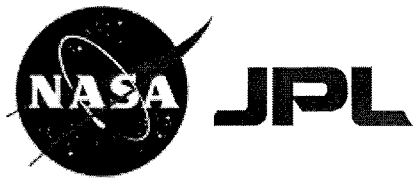
El Niño and La Niña Forecasting & Monitoring



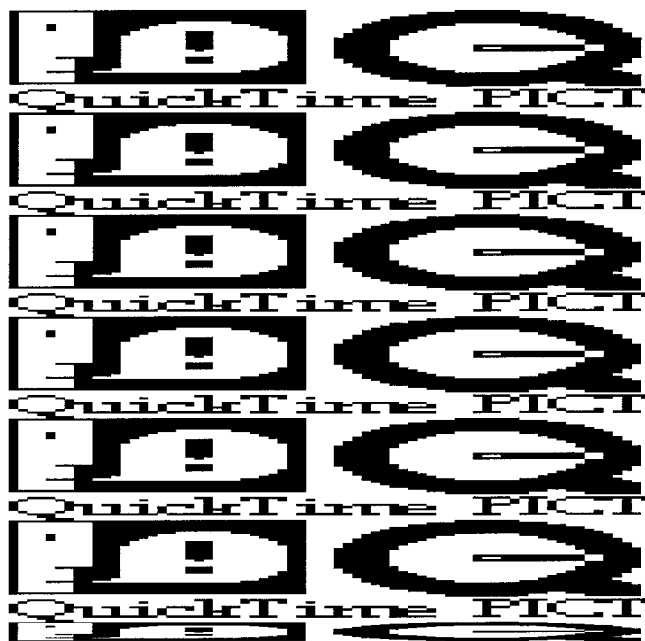
- Monitoring El Niño and La Niña
- NOAA long term climate forecasts: flood control, agricultural strategy, water and energy use planning
- Media use to explain weather and climate to the public
- TOPEX/POSEIDON data have become familiar to more than a billion people worldwide

Images produced by Dr. Victor Zlotnicki, Dr. Lee -Lueng Fu and Akiko Hayashi, of the Oceans Research Element at NASA's Jet Propulsion Laboratory.

Jason-1 *Sea Level From Space*



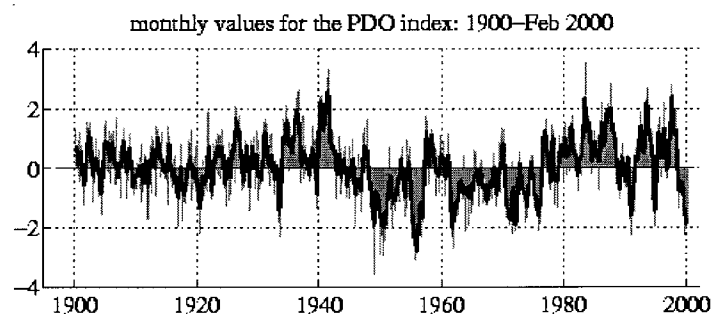
Pacific Decadal Oscillation



•April 2001 Pacific Decadal Oscillation pattern that has persisted for the past three years

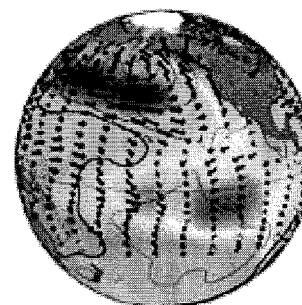
•Warm water (high sea levels in red and white)

•Cooler water (lower sea level in blue)

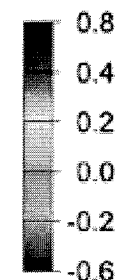
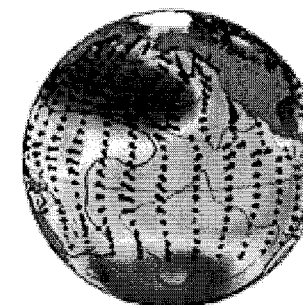


Pacific Decadal Oscillation

positive phase

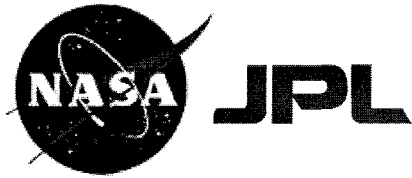


negative phase

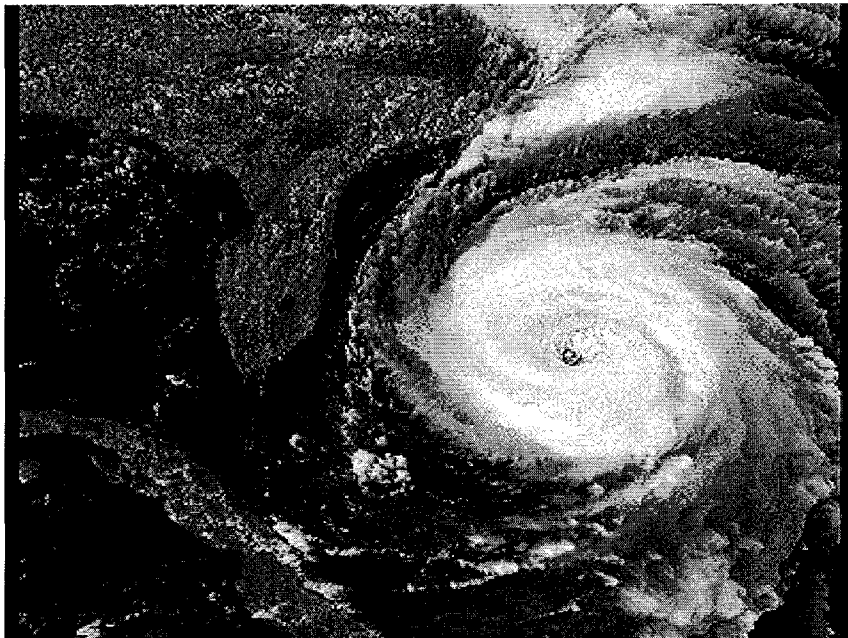
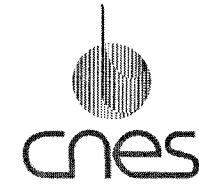


PDO images are courtesy of Nathan Mantua & Steven Hare, University of Washington, Units are degrees Celsius

Jason-1 Sea Level From Space



Hurricane Forecasting



- Long-term seasonal forecasts of the numbers and strengths of hurricanes expected in a given hurricane season
- Short term forecasts of the strength of individual hurricanes



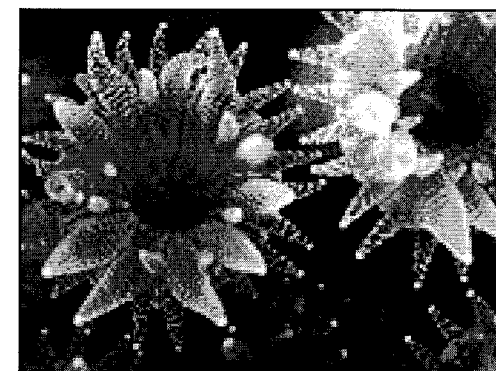
Coral Bleaching Climate Change



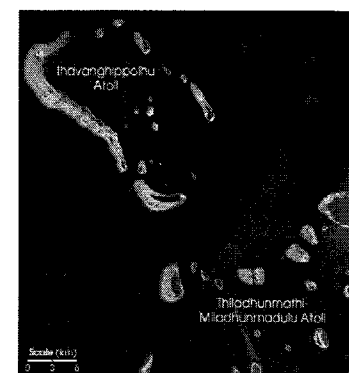
- TOPEX/POSEIDON altimeter sea level and NOAA AVHRR sea surface temperature data monitor and assess global coral reef environments.
- High and low tropical sea levels and ocean temperatures caused by the '97 to '98 El Niño/ La Niña “bleached” 25% of all coral reefs.

90% Bleached

QuickTime™ and a
GIF decompressor
are needed to see this picture.



Biodiversity - Coral ecosystems
are our oceans “rainforests”

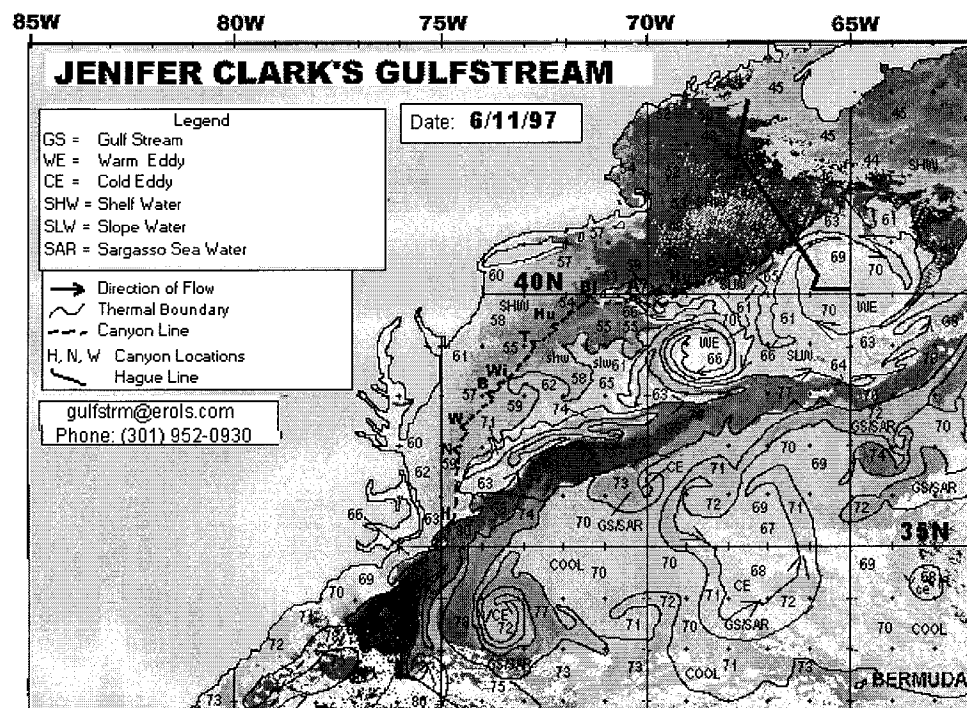
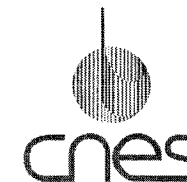


Maldives, Central Indian
Ocean, NASA Landsat 7 image

Jason-1 Sea Level From Space



Marine Operations



Private companies make charts of surface height

Eddies and swift moving currents can be identified

Transatlantic ship routing, cable laying, and oil exploration use these maps to increase safety and economic return.

Jason-1 *Sea Level From Space*



The Next Generation

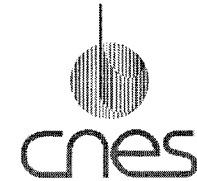


JASON-2

Jason-1 *Sea Level From Space*



More Information



NASA/CNES Joint Altimetry

<http://www.tp-jason.oceanobs.com/index.html>

NASA Ocean Altimetry

<http://sealevel.jpl.nasa.gov>

CNES Jason-1

http://aviso.jason.oceanobs.com/html/general/welcome_uk.html

El Niño

http://www.jpl.nasa.gov/el_nino/